Synchronising Product Data in Healthcare

Global GDSN Healthcare Pilot Report

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Executive summary

Unreliable and inefficient data management in the Healthcare supply chain may impact patient safety and result in increased costs for manufacturers, distributors and Healthcare providers. The GS1 Global Data Synchronisation Network® (GDSN) minimises data errors by eliminating human intervention and eliminates the need to maintain multiple catalogues. The implementation of standardised global data synchronisation through the GDSN in other sectors, particularly in the Fast Moving Consumer Goods (FMCG) sector, has proven that the infrastructure and the standards are in place, and more importantly has proven the benefits for retailers and suppliers. Also the Healthcare sector can benefit from global data synchronisation and can leverage what was established in the FMCG sector.

National GDSN pilots in the U.S. and a production GDSN roll out in Australia had already demonstrated that the GDSN meets the minimum criteria needed by the Healthcare sector within their national boundaries. To ensure a smooth and planned cross-border implementation of the GDSN in Healthcare, GS1 Healthcare has organised a global pilot. GS1 Healthcare is a global, voluntary user community bringing together all Healthcare stakeholders and aiming to lead the implementation of global supply chain standards in Healthcare. Its GDSN Healthcare Work Team is working on a data synchronisation standard which will allow the Healthcare industry to use the GDSN.

Baxter, B. Braun and Becton Dickinson participated in the global pilot from the supply side in Australia. Amerinet, Ascension Health, Mayo, Premier and Sisters of Mercy Health System represented the demand side in the U.S. GS1net (GS1 Australia's GDSN-certified data pool), 1SYNC (GS1 US's GDSN-certified data pool), and Ontuet enabled the global data synchronisation through the GDSN. More than 2,500 Global Trade Item Numbers (GTINs) were exchanged amongst the pilot participants.

The pilot clearly demonstrated that the GDSN provides the infrastructure to exchange data between data pools across international borders and facilitates synchronisation across the entire length of the supply chain (manufacturer, distributor, GPO, hospital). Pilot participants experienced little change from the U.S. market to international markets, indicating that the solution is portable and scalable. Another important finding was that there needs to be global agreement on data fields. The implementation is smoother when there is agreement on which attributes are required for Healthcare items versus optional functionality which is available within the network. Regardless of some slight attribute gaps, pilot participants agreed that the product data provided would be useful in its current state.

As a next step, the U.S. are developing plans to migrate users into GDSN production whilst Australia will continue the production roll out of the National Product Catalogue (NPC) which is now also being endorsed by the Private Healthcare sector. GS1 is also working with additional GS1 Member Organisations to determine future pilot expansion needs for other countries. The global Healthcare user group continues to work on further enhancements to GDSN attributes to support Healthcare specific data requirements. Users already implementing GDSN (or planning to) can continue as planned; the current GDSN standard provides support for 228 Healthcare specific business needs, and reaps the benefits which other sectors are realising through implementation of the GDSN.

1. Opportunities for synchronising data in the Healthcare supply chain

Unreliable and inefficient data management in the Healthcare supply chain may impact patient safety and result in increased costs for manufacturers, distributors and Healthcare providers.

There are many systems across Healthcare companies and organisations that use and rely on supply chain information about products and supply chain partners, including inventory replenishment and distribution systems, billing/accounts payable, Barcode Point of Care (BPOC) systems, prescription drug pedigree systems and medical device reporting. Although there are many systems using the same information about products and supply chain partners, there is typically no central database that houses all of that information and ensures that it is accurate and up-to-date (i.e. an "authoritative source" for information).

Instead, each system generally uses its own database. As a result, there is no method for ensuring that the information about products and supply chain partners being used in one system is the same as the information being used in another. Moreover, whenever a supplier updates or changes any of its product or location information, all of the disparate systems and databases that rely on that information must be updated individually. Unfortunately, this approach to data management undermines the reliability of the information being used – and it comes at a high cost for both patient safety and supply chain management. In fact, the use of inaccurate supply chain information costs the Healthcare industry billions annually.

The use of inaccurate supply chain information costs the Healthcare industry billions annually.

For example, consider the following in the U.S.[1]:

- The Healthcare supply chain spends 24% to 30% of administration time everyday on data cleansing and corrections – costing the Healthcare industry $2 to $5 billion each year due to supply chain information inefficiencies.
- Although hospital product information is constantly being updated, 30% of buyer systems are inaccurate. As a result, many Healthcare buyers are sourcing products using old information – and each of the resulting erroneous transactions costs $60 to $80 to correct.
- 60% of all invoices generated in the Healthcare supply chain have errors – and each invoice error costs $40 to $400 to reconcile.
- Erroneous data increases supply costs 3% to 5%.

This situation is not unique to the U.S. This is a problem many countries face in Healthcare.

The costs to both supply chain partners for queries, discrepancies and additional orders or deliveries are significant.

A pharmaceutical supply chain study[2] conducted in Australia in 2007 involved the comparison between supplier data with data from a hospital pharmacy information system. The supplier data was provided through the National Product Catalogue. A total of 384 data records were compared and results showed that only 97 records (or 25% of records) existed in the pharmacy system. Of the 97 records, further analysis of key data fields indicated that significant differences existed between the product data held in supplier systems and the data available in hospital pharmacy application. Some discrepancies were particularly interesting, for example an item classified as being a

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1   William L. Rosenfeld & John L. Stelzer, Data Synchronization in Healthcare: A Solvable Problem, Sterling Commerce, http://findarticles.com/p/articles/mi_m0BPC/is_4_31/ai_n19002635.

2   Monash Pharmacy Project, Phase 2 Report, pp 23-25, www.gs1au.org/industry/healthcare/monash.asp
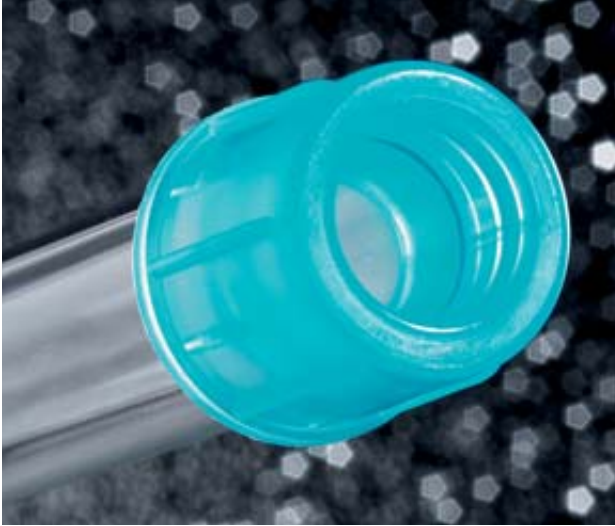
laxative by the supplier was classified as a multivitamin in the hospital application. In another example, supplier data indicated an item was a single unit whilst the item appeared in the hospital pharmacy application as box of 18. These results highlighted that pharmacy purchasing staff are making decisions without complete and accurate product information and the potential for costs to both supply chain partners due to queries, discrepancies and additional orders or deliveries are significant.

On the demand side, one Australian government health department has estimated that the cost of cataloguing a new item in a hospital system is AUS$47. Given that the standard hospital system in Australia contains and average of 10,000 items, it would cost AUS$470,000 and take over 10,000 hours of effort (1 person full time for 5 years) to fully populate a hospital item master, excluding data maintenance time[3]. It is estimated that 24% of hospital supply administration time in healthcare is spent on data cleaning and corrections[4].

Suppliers also invest considerable time on data cleaning, corrections and reconciliation of purchase orders they receive with incorrect information, wrong identifiers and descriptions or even obsolete products. One supplier has estimated that 47% of all pricing errors in purchase orders result from public hospital data errors, costing them AUS$40K per year. Similarly, 50% of all item data errors (item identification and unit of measure) were also due to errors in hospital systems, costing them a further AUS$50K annually[5].

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3   Presentation 'Data Synchronization in the Australian Healthcare Sector' CHeS May 10 2007.
4   Healthcare Financial Management Association. 'The time is right for Data Synchronization'. February 2007.
5   Presentation 'Data Synchronisation in the Australian Healthcare Sector' CHeS May 10 2007.

2. What is the GDSN?

The GS1 Global Data Synchronisation Network (GDSN) minimises data errors by eliminating human intervention and eliminates the need to maintain multiple catalogues.
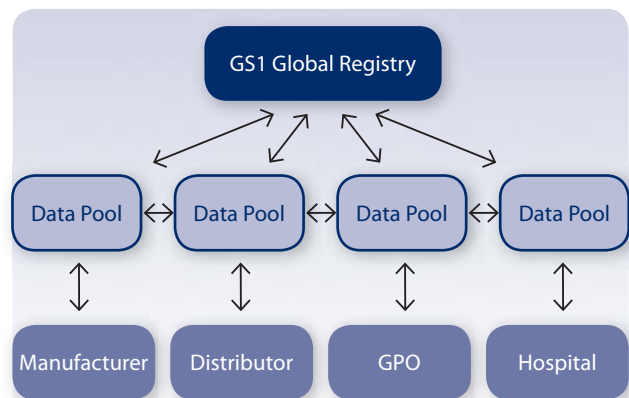
The GDSN, built around the Global Registry and GDSN-certified data pools, provides a powerful environment for secure and continuous synchronisation of accurate data. GDSN enables a single point for master data.

GS1 Global Data Synchronisation Network

GDSN-certified data pools serve as warehouses for product and location information, based on GS1 Identification Keys (Global Trade Item Number – GTIN and Global Location Number – GLN). They provide users with a central location for storing and managing supply chain information which they need to support their systems and operations. Data pools provide a single point for accessing the GDSN and the Global Registry. In addition to storing information, GDSN-certified data pools also ensure the confidentiality of user information, ensure that all of the information is properly defined and formatted, and manage the ongoing communication of information amongst supply chain partners. Data pools can be run by a GS1 Member Organisation or by a solution provider.

The GS1 Global Data Synchronisation Network (GDSN) enables a single point for master data.

The GS1 Global Registry maintains the data pool location of each GTIN and GLN in the GDSN. It is how the GDSN knows where GLN and GTIN information can be found. It serves as the "information directory" for the GDSN identifying where the information is held across the network and enabling the uniqueness of the registered items and parties.

GS1 GDSN, Inc., a neutral, not-for-profit organisation, is the global governance body for the Global Data Synchronisation Network. It operates the GS1 Global Registry and manages the certification of data pools.

GS1 GDSN, Inc. is part of GS1, a global organisation dedicated to the design and implementation of global standards and solutions to improve the efficiency and visibility of supply and demand chains globally and across sectors. The GS1 System of Standards is the most widely used supply chain standards system in the world. GS1 is a fully integrated global organisation with over 30 years experience in global standards. The Global Standards Management Process, or GSMP, is the worldwide collaborative forum where GS1 standards are built and maintained. GSMP also develops the standards needed to support the GDSN, including for example mandatory product attributes.

The GDSN is already widely used for the secure exchange of standardised product information in other sectors in many countries around the world. Launched in 2004, the number of supply chain partners connected to the GDSN has increased from 200 in 2005 to 16,856 in August 2008, including leading retailers such as Ahold, Carrefour, Metro, Wal-Mart and Wegmans and leading manufacturers such as 3M, Coca-Cola, Johnson & Johnson, P&G, and Unilever. More than 3 million GTINs have been registered in the GS1 Global Registry between 2005 and October 2008. Currently 23 GDSN-certified data pools support global data synchronisation in more than 50 countries worldwide.

The implementation of global data synchronisation through the GDSN in other sectors, particularly in the Fast Moving Consumer Goods (FMCG) sector, has proven that the infrastructure and the standards are in place and more importantly has proven the benefits for retailers and suppliers. Several industry studies[6] have quantified the benefits for all supply chain partners. For retailers for example, order and item administration improved by 50% when data synchronisation was in place; coupon rejection at the check-out was reduced by 40%; data management efforts were reduced by 30%, an overall improvement of on-shelf availability, with out-of-stock items reduced from 8% to 3%. For suppliers for example,

time-to-shelf was reduced by an average of 2 to 6 weeks; order & item administration improved by 67%, item data issues in sales process were reduced by an average of 25% to 55%.

The Healthcare sector can also benefit from global data synchronisation and can leverage what was established in the FMCG sector.

3. How does the GDSN work?

GS1 Identification Keys (Global Trade Item Number – GTIN and Global Location Number – GLN) are foundational for the GDSN to identify products and locations.

The GDSN consist of 24 mandatory product attributes that support the registration of products in the GS1 Global Registry and basic product information transactions. Ten of the mandatory attributes are Boolean (yes/no responses) related to the products, others are product status, dates or auto-generated fields. A list of the mandatory attributes can be found at the end of this report in Appendix B.

Additional standard product attributes are selected by the supply chain partners who chose to exchange data via the GDSN. Each sector can also define the product attributes that are mandatory or optional based on its sector-specific business requirements. The GDSN Healthcare work team has defined 228 data requirements, which are supported by the current GDSN standard. While additional requirements are being added to the GDSN, the basic data requirements can be met with the existing attributes. The global GDSN Healthcare pilot has confirmed these finding and recommendations.

The GDSN offers a standards-based approach to (1) storing supply chain information, (2) ensuring that the information is properly defined and formatted and (3) keeping that information up-to-date.

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6   Including "Synchronisation - The Next Generation of Business Partnering", Accenture August 2006, and "Global Data Synchronisation at Work in the Real World", GCI/Cap Gemini March 2005.

3.1 Information storage

Once the identifiers and attributes are defined, suppliers store their identifiers (GTIN and GLN) with the corresponding information in a GDSN-certified data pool (known as uploading or on-boarding data). The GDSN-certified data pool checks all information to ensure it is properly defined and formatted per GS1 standards (known as validation), and then registers the corresponding GTINs and GLNs with the GS1 Global Registry (known as registration).

Storing information on the GDSN

GS1 Global Registry

↑ Registration

Data Pool   Validation

↑ On-Boarding/
Uploading Data

Manufacturer
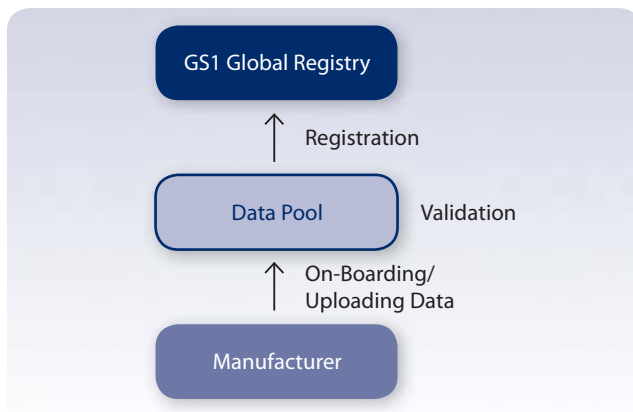
3.2 Information sharing

The GDSN provides a controlled electronic messaging system for supply chain partners to systematically exchange information for items they have agreed to transact on; GDSN-certified data pools ensure the confidentiality of information provided by the supplier. Supply chain partners can only receive the information once authorised by the supplier. Through its GDSN-certified data pool, the data recipient submits a "subscription request" to receive the information uploaded by the supplier and the supplier "authorises" its data pool to publish the information to that data recipient. The data recipient sends a confirmation to the data owner via its company's data pool.

GDSN-certified data pools manage subscriptions for their users and process the exchange of information among their respective data pools using the GS1 Global Registry to obtain the necessary data pool locations.

Sharing information in the GDSN

GS1 Global Registry

Data Pool ←→ Data Pool

Authorise
Publication ↑   ↑ Request
Subscription

Manufacturer   Hospital
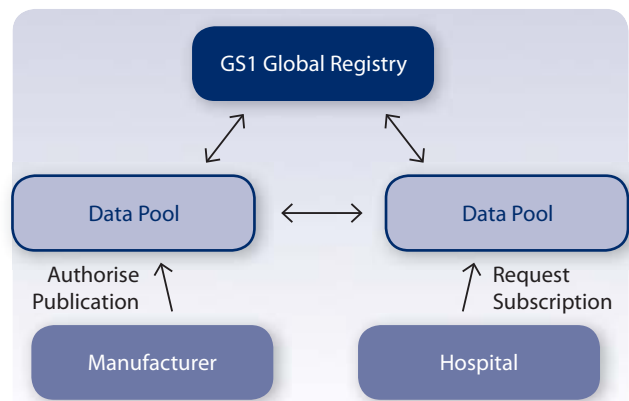
4. Global GDSN pilot in Healthcare

Healthcare is by nature a global sector, with supply chains that often cross borders necessitating the standardised and reliable exchange of product information across borders. All Healthcare supply chain partners, be it from the supply side or from the demand side, can benefit from a single point of entry to provide or to receive product information.

4.1 National GDSN pilots in the U.S. and the Australian NPC

National pilots in the U.S. and a production roll out in Australia had already demonstrated that the GDSN meets the minimum criteria needed by the Healthcare sector within their national boundaries.

In Australia, the National Product Catalogue (NPC) is a Public Healthcare Sector GDSN project endorsed by all Australian governments (both state and federal) that has been in production for the past 2 years. The NPC is hosted on GS1 Australia's GDSN-certified data pool GS1net. A number of studies have been conducted on the benefits of NPC, including one by the Monash Pharmacy Project, a pharmaceutical supply chain working group. This study was undertaken through its Phase 2 implementation activities with participation from Abbott Australasia, Baxter, Bristol-Myers Squibb, Hospira Australia, Novartis Australia, Orion Laboratories, Pfizer Australia, CH2, Symbion Hospital Services, Southern Health Pharmacy Departments and Health Purchasing Victoria.

Monash Pharmacy Project, www.gs1au.org/industry/healthcare/monash.asp

In the U.S., the Department of Defense (DoD) sponsored a national pilot involving Becton Dickinson, Sage Products, Inc., Premier Inc., and Baptist Health South Florida. One manufacturer concluded: "For manufacturers, it's important that a product data synchronisation solution and unique device identification system for Healthcare be global in nature in order to reduce data sharing requirements, redundancy and costs. GDSN and the globally accepted product data standards show great potential for Healthcare." A participant from the demand side acknowledged that the implementation of data synchronisation will likely require information system upgrades or process re-engineering, yet "the benefits of implementing such a system far outweigh the unacceptable costs of the status quo. Other industries don't have the same kind of data problems we have in Healthcare, and now it is our turn to reap the benefits from [data synchronisation]. GDSN data could be implemented today using existing business systems."

The second phase of the Pilot has expanded to include additional supply chain partners including manufacturers, group purchasing organisations, distributors and providers.

The phase 1 report and the list of current DoD Pilot participants can be found here:

https://dmmonline.dscp.dla.mil/datasynchronization/dodpilots.asp.

To ensure a smooth and planned cross-border implementation of the GDSN in Healthcare, GS1 Healthcare organised a global pilot. GS1 Healthcare is a global, voluntary user community bringing together all Healthcare stakeholders and aiming to lead the implementation of global supply chain standards in Healthcare. Its GDSN Healthcare Work Team is working on a data synchronisation standard which will allow the Healthcare industry to fully use the GDSN.

4.2 Global pilot objectives

The first objective of the global GDSN pilot in Healthcare was to demonstrate that the GDSN can work across the multinational Healthcare sector with full interoperability provided by the GDSN-certified data pools serving different geographies.

The global GDSN pilot also wanted to demonstrate that the participating supply chain partners are able to synchronise Healthcare supply chain product data end-to-end using the GDSN, assessing internal readiness, system and data preparation, information exchange between the supply chain partner and their data pool and to the ultimate recipient of the information.

The global GDSN pilot finally intended to provide additional information on how the GDSN supports Healthcare supply chain and product data needs, in particular data flow, data standards, data accuracy and product and location identification.

4.3 Global pilot participants

4.3.1 **Supply side (Australia)**

Baxter Healthcare
Baxter International Inc. (www.baxter.com) develops, manufactures and markets products that save and sustain the lives of people with haemophilia, immune disorders, cancer, infectious diseases, kidney disease, trauma, and other chronic and acute medical conditions. As a global, diversified Healthcare company, Baxter applies a unique combination of expertise in medical devices, pharmaceuticals and biotechnology to create products that advance patient care worldwide. Worldwide sales: 11.3 billion US$

B. Braun
B. Braun (www.bbraun.com) supplies the global Healthcare market with products for anaesthesia, intensive medicine, cardiology, extra corporeal blood treatment and surgery, as well as services for hospitals, general practitioners and the homecare sector. Through dialogue with those who are using B. Braun´s products on a daily basis, the company is continually gaining new knowledge, which it incorporates into product development. In this way,

the company contributes with innovative products and services towards optimising working procedures in hospitals and medical practices all over the world and improving safety – for patients, doctors and nursing staff. Worldwide sales: 3.57 billion €

Becton Dickinson

Becton Dickinson (BD) (www.bd.com) is a global medical technology company that is focused on improving drug delivery, enhancing the diagnosis of infectious diseases and cancers, and advancing drug discovery. BD develops, manufactures and sells medical supplies, devices, laboratory instruments, antibodies, reagents and diagnostic products through its three segments: BD Medical, BD Diagnostics and BD Biosciences. It serves Healthcare institutions, life science researchers, clinical laboratories, the pharmaceutical industry and the general public
Worldwide sales: 6.3 billion US$

4.3.2 Demand side (U.S.)

Amerinet

As a leading group purchasing organization, Amerinet partners with healthcare providers to reduce costs and improve quality. Amerinet assists members in their efforts to improve efficiencies and create new revenue streams. Based in St. Louis with offices in Salt Lake City, Providence, R.I., and Warrendale, Pa., Amerinet serves acute and non-acute healthcare providers throughout the United States.

Ascension Health

Ascension Health (www.ascensionhealth.org) is transforming Healthcare by providing the highest quality care to all, with special attention to those who are poor and vulnerable. Ascension Health, which provided US$808 million in care of persons who are poor and community benefit last year, is the nation's largest Catholic and non-profit health system. Ascension Health's Mission-focused Health Ministries consist of 106,000 associates serving in 20 states and the District of Columbia.

Mayo

Mayo Clinic (www.mayoclinic.com) is the first and largest integrated, not-for-profit group practice in the world. Doctors from every medical specialty work together to care for patients, joined by common systems and a philosophy of "the needs of the patient come first." More than 3,300 physicians, scientists and researchers and 46,000 allied health staff work at Mayo Clinic, which has sites in Rochester, Minn., Jacksonville, Fla., and Scottsdale/Phoenix, Ariz. Collectively, the three locations treat more than half a million people each year.

Premier

Serving more than 2,000 U.S. hospitals and 53,000+ other Healthcare sites, the Premier healthcare alliance and its members are transforming Healthcare together (www.premierinc.com). Owned by not-for-profit hospitals, Premier operates one of the leading Healthcare purchasing networks and the nation's most comprehensive repository of hospital clinical and financial information. Headquartered in San Diego, Premier has offices in Charlotte, N.C., Philadelphia and Washington.

Sisters of Mercy Health System

Mercy (www.mercy.net) operates facilities and services in a seven-state area encompassing Arkansas, Kansas, Louisiana, Mississippi, Missouri, Oklahoma and Texas. Health System services are provided by approximately 29,500 co-workers and 4,000 physicians. Mercy consists of 18 acute care hospitals, a heart hospital, outpatient care facilities, physician practices, skilled nursing and long-term residential care facilities, clinics, a managed care organisation and other health-related services.

4.3.3 GDSN-certified data pools and solution providers

1SYNC (GS1 US)

1SYNC (www.gs1us.org) is a GDSN-certified data pool and operates as a not-for-profit subsidiary of GS1 US to help the industry maximise the value of data synchronisation. More than 5,000 leading manufacturers and retailers in the alcohol and beverage, automotive, drug, entertainment, grocery, hard lines, Healthcare and office products industries are part of the 1SYNC data pool, including Coca-Cola, Colgate Palmolive, Johnson & Johnson, Kraft, Kroger, Nestle, PepsiCo, Procter & Gamble, Sara Lee, SUPERVALU, Unilever, Wal-Mart and Wegmans Food Markets. 1SYNC operates in the United States, Europe, Mexico and South America.

GS1net (GS1 Australia)

GS1net (www.gs1au.org) is GS1 Australia's data synchronisation solution for Australia and New Zealand. GS1net is used by more than 1,400 companies across a number of industry sectors including Healthcare, Grocery, Liquor, Hardware, Automotive, General Merchandise and others. The National E-Health Transition Authority (NEHTA), in association with GS1 Australia, is rolling out a National Product Catalogue (NPC) as the 'single source' of item master data for public health institutions seeking to purchase medicines, medical devices and other necessary Healthcare items. The NPC is hosted by GS1 Australia on GS1net.

Ontuet

Ontuet (www.ontuet.com) is a fully certified solutions and service provider. Ontuet provides client services, implementation consulting and support and wide range of data synchronisation technologies to over 1,000 clients. Ontuet is one of the largest and fastest growing provides of these products and services in the world due to our customer-centric focus and approach. Ontuet has vast experience in grocery, Healthcare, automotive, electronics, office supply, hardlines, soft lines, major appliances and numerous other product categories.

4.4 Pilot overview

defined and formatted per GS1 Standards and then registered a small subset of this information with the GS1 Global Registry.

Step 3: Request subscription
Pilot participants from the demand side, through 1SYNC, subscribed to receive the registered information.

Step 4: Publish data
GS1net published the requested information to 1SYNC.

Step 5: Confirm & Inform
Pilot participants from the demand side sent a confirmation to the suppliers via 1SYNC and GS1net, which informs the supplier of the action taken by the recipient using the information.

4.5 Pilot results

The pilot clearly demonstrated that the GDSN provides the infrastructure to exchange data and messages between data pools across international borders and facilitates synchronisation across the entire length of the supply chain (manufacturer, distributor, GPO, hospital). Metrics indicate that messages were successfully sent and received.

Global GDSN Healthcare Pilot Flow
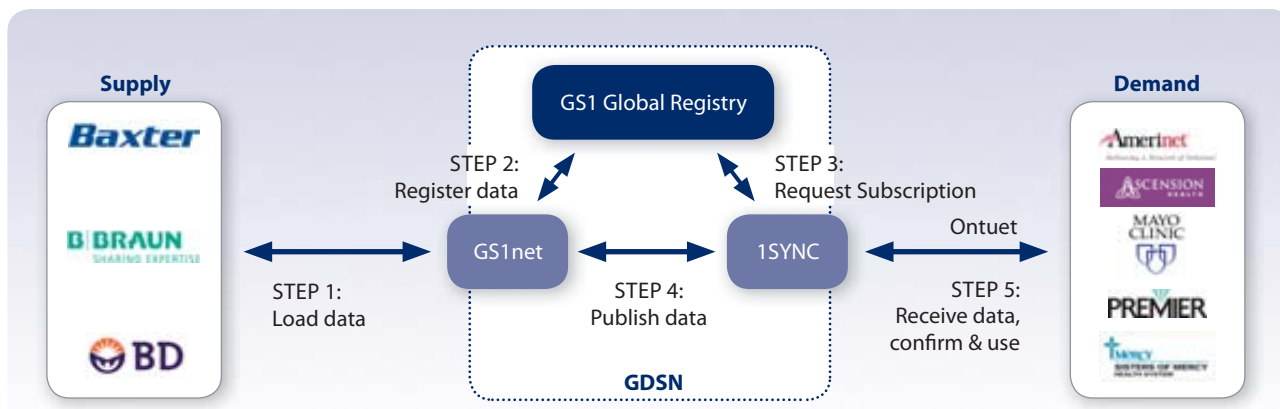
Step 1: Load data
Baxter, B. Braun and BD (Australia) loaded their product and company information on GS1net.

Step 2: Register data
GS1net checked all information to ensure it is properly

The process that suppliers undertook as part of the pilot was very simple. The first step, involving the loading of item data onto GS1net (NPC), had already been completed by all participating suppliers given the local Australian Government initiative around Data Synchronisation. The only step required was the
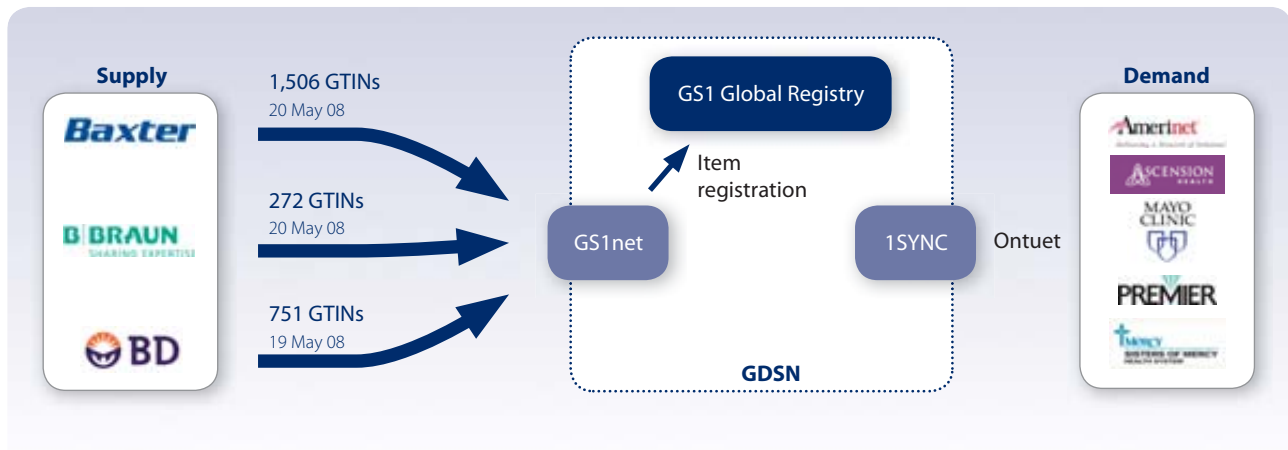
duplication of this item data onto the GS1net Beta System for the purpose of the pilot. This activity was completed by GS1 Australia on behalf of participating suppliers.

The above chart shows how many GTIN's each participating supplier has uploaded to GS1net.

Once subscriptions were entered, suppliers published all hierarchies to the U.S. data recipients. This activity was completed through the GS1net web interface. Suppliers monitored the responses received from U.S. data recipients as they each subscribed to the data published to them. The process was again very straightforward and required little time from participating suppliers.

The following chart shows the number of Catalogue Item Notification (CIN) XML messages that were sent

(one CIN message represents one unique hierarchy, which may contain multiple GTINs). The chart also shows the acknowledgements sent by the data recipients, indicating that messages were successfully received by all participants.

4.6 Pilot lessons learned

"Talking apples to apples when exchanging information between supply chain partners"

All pilot participants agreed that the global pilot objectives were successfully met. The GDSN infrastructure works in various settings and that the GDSN 'plumbing' is in place to enable cross-border data synchronisation. Messages were sent and received as expected and in a timely fashion.

Exchanging & Confirming Data
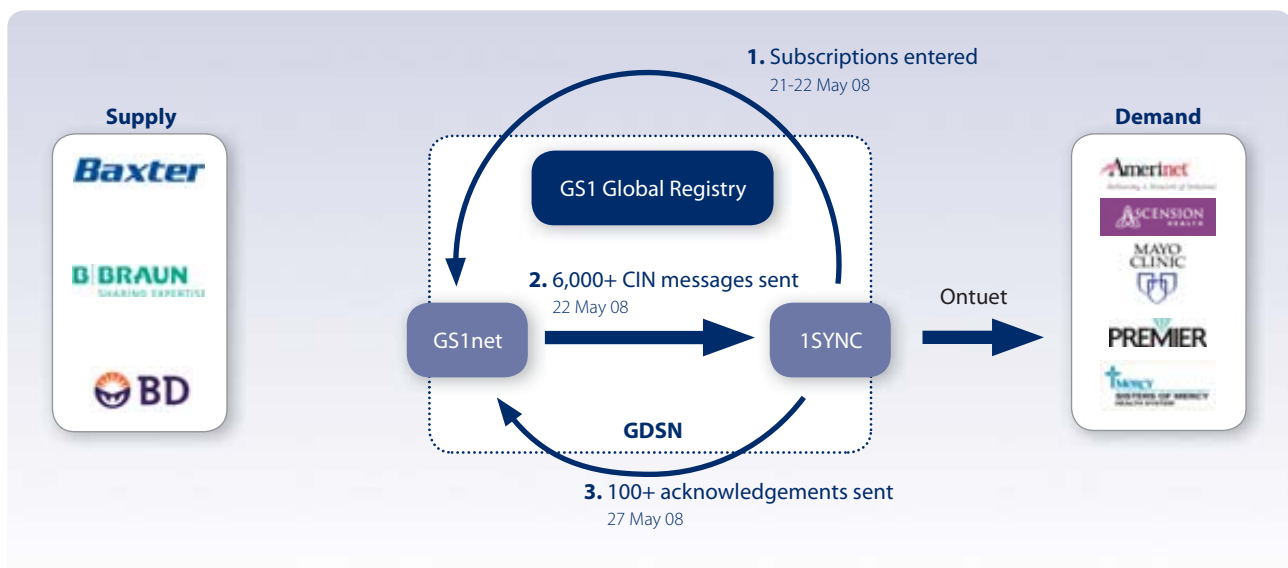
The GDSN infrastructure is in place to enable cross-border data synchronisation.

Another important conclusion was that there needs to be global agreement on data field requirements. The implementation is smoother when there is agreement on which attributes are required by Healthcare versus which are considered optional. Global guidelines for selecting description fields to populate should be developed. Additionally, agreement on fill strategies for dimensions and weights will reduce confusion and/or multiple requirements being imposed on data providers.

Strategies for safety related fields also need clarification and agreement; latex, for example, would benefit from a single attribute that indicates whether the package is marked or not. Back-end process automation will further reduce the error rate associated with manual intervention and work-around routines. The more machine-to-machine automation used to replace manual procedures, the higher the efficiency and data quality users will realise.

4.6.1 **Supply side lessons learned**

Baxter Healthcare
"Expansion of the use of GS1 to all countries will assist in cost reduction in the global supply chain across both suppliers and customers. This will benefit everyone if it can be implemented, as most of us sit on both sides of the chain. The cost of inaccurate information for both groups is extraordinarily high, and a major waste of resources," said Elaine Bailey, Sales & Marketing Systems Analyst, Baxter Healthcare Australia.

Baxter's major finding was that the GDSN offers an excellent tool for supply and demand sides to be able to use the catalogue for full B2B transactions, regardless of the parties' physical location. The process required to publish data was relatively simple and effort required was less than expected; about 10 minutes per recipient. Publication at the GLN level is adequate, as long as there is a GLN for each specific supply chain partner and special pricing at lower levels (i.e. another GLN) is allowed.

B. Braun
"The pilot showed that the data exchange challenges faced locally are not unique, while demonstrating how the GDSN works across international boundaries and can support / improve supply chain efficiencies in the future. The overall

experience was relatively "pain free" thanks to GS1", said Elizabeth Stamatelos, Corporate Services Manager, B. Braun Australia Pty Ltd.

"The main problem today, related to master data, is the lack of consistent data standards which are causing inefficiency in the supply chain. Without standards it is almost impossible to streamline electronic processes," said Volker Zeinar, Global Coordination Auto-ID Affairs, B. Braun, *"Sometimes, particularly in electronic processes, we think we talk about the same things but we don't. Ordering the wrong item, the wrong quantity or delivering to a wrong address causes problems and increases cost to suppliers as well as customers. In some cases, this can even affect patient safety. Therefore, a common agreement to use the GS1 Primary Keys; GTIN and GLN, is an important pre-requisite for overcoming misunderstandings and the associated negative and unintended consequences. On the other hand, we have to deal with different naming conventions for the same information, depending on the business partner or country. This could also be very confusing. Another issue is resourcing the process of catalogue information maintenance for upload to external databases, which is very often a manually driven process. We want to avoid uploading data again and again to external data pools. We trust the methodology of the GDSN and are convinced that this model has the potential to become a success story in Healthcare."*

Uploading the data was straightforward for B. Braun: data were already available for the National Product Catalogue in Australia and required minimal additional efforts with the support from GS1 Australia.

B. Braun received subscription confirmations from the data recipients and the first catalogue item acceptance confirmations.

Becton Dickinson (BD)
Once BD populated the data, publishing the data required minimal effort. But the initial effort to populate data was extensive; in excess of 400 hours to gather, validate, sign off and populate the data pool. Publication at the GLN level is adequate as long as the GLN level is at the individual hospital level, since this is where pricing is required. Integrating the confirmations into BD's internal systems would benefit the company as it eliminates the need for confirmation on pricing and product changes.

BD considered GS1's support in building awareness and understanding of the process very important.

Base Unit or Each (GTIN)		Pack or Inner Pack (GTIN)		Case (GTIN)	
Is Trade Item a Base Unit?	Y	Is Trade Item a Base Unit?	N	Is Trade Item a Base Unit?	N
Is Trade Item a Consumer Unit?	Y	Is Trade Item a Consumer Unit?	N	Is Trade Item a Consumer Unit?	N
Is Trade Item a Despatch Unit?	N	Is Trade Item a Despatch Unit?	N	Is Trade Item a Despatch Unit?	Y
Is Trade Item an Invoice Unit?	N	Is Trade Item an Invoice Unit?	N	Is Trade Item an Invoice Unit?	Y
Is Trade Item an Orderable Unit?	N	Is Trade Item an Orderable Unit?	N	Is Trade Item an Orderable Unit?	Y
Item Registered	Y	Item Registered	Y	Item Registered	Y

Other key findings

One of the major learnings for the pilot participants was that based on GDSN principles, if a GTIN belongs to multiple product hierarchies, then the recipient will receive this GTIN record multiple times (i.e. once per hierarchy) even though this record will be loaded only once by the supplier. This requirement is there to ensure integrity and completeness in the communication of product hierarchies between data sources and data recipients.

GTINs need to be registered in the GS1 Global Registry for each packaging level (case, pack, base unit). If the GTINs for a case and a pack have been registered, but not the GTIN for the base unit, this will stop full publication.

Each packaging level must also contain at least one orderable unit. If not, full publication will not occur. On the other hand, if multiple orderable units exist for one hierarchy, multiple CIN's are created, leading to multiple sending of GTIN records. When two hierarchies share the same base unit, the base unit will be contained in both CIN messages and the recipient will receive the GTIN record twice.

Another finding underscored the importance of removing manual intervention from the Data Synchronisation process and highlights the importance of the automatic GTIN registration functionality offered by data pools in a production environment.

Registering GTINs in the GS1 Global Registry, mandatory for publication, is normally an automated process. Since GS1net, however, was required to use a Beta system for this pilot, which is not enabled for automatic GTIN

registration in the GS1 Global Registry, a manual process was used. Manual processes tend to be more error prone and, as a result, some GTIN's ended up not being registered in the GS1 Global Registry, which subsequently lead to some GTINs not being accurately published to data recipient in the US.

These publication errors were a result of using a Beta system for the pilot and would not happen in the production environment due to validations and confirmation routines built into the data pool.

4.6.2 Demand side lessons learned

All pilot participants from the demand side were also involved in the U.S. pilot sponsored by the DoD and experienced little change from the U.S. context to the international context, indicating that the solution is portable and scalable.

The solution is portable and scalable.

Data recipients received the data in timely fashion: files were received by all subscribers in 8 to 12 business hours. Buyer set up preferences, seller publish routines and data pool and/or onboarding partners batch schedules are all variable, but for most, data was received the next business day. The time zone difference between Australia and the U.S. provided no interference. Each data recipient also received the data files in the expected format. Incoming XML messages from 1SYNC were converted to flat files by Ontuet and made available to participants via FTP download. These flat files were designed to align with the U.S. GDSN Work Group field recommendations; additional

Australian specific attributes were not passed to recipients in the flat file format. Recipients utilising the Ontuet flat file were asked to define preferences for weights and measures fields and conversions were done accordingly.

Each data recipient was able to send sample confirmation messages to each of the senders without errors. Supplier metrics established that the messages sent to the suppliers, were also received by them.

GLN subscriptions were utilised without issue. The process was as straightforward as subscribing to U.S. manufacturer data.

A gap analysis performed prior to the pilot established that requirements on 'required and optional attributes' are aligned, with minor exceptions, between the Australian and the U.S. markets.

Both countries use the same attribute to convey the manufacturer part number. This is more significant than it might seem: manufacturer part numbers are a key field in the current Healthcare supply chain in the U.S., in earlier phases of the DoD pilot it was discovered that multiple attributes or extensions are used by various U.S. industries using the GDSN to convey this number (model number, for example). The joint use of the same attribute by the U.S. and Australia allowed for buyers to recognise the items being communicated, without issue.

Both countries look to UNSPSC for product classification and both have chosen similar description attribute strategies (short, medium and long), but have not always chosen the same attributes to convey them. Based on lessons from the Global Pilot, the U.S. pilot work group has refined their initial data field recommendations (totalling 40 or so fields) to include the use of the "Trade Item Description" attribute which is widely utilised by GDSN users, including Australia Healthcare.

Although the use of attributes varies greatly by market, the pilot established that there is much common ground between the Australian and U.S. markets and that differences in which attributes are used are resolved as supply chain partners migrate into production.

The gaps identified in the attribute analysis will be incorporated into the standards development work of the GSMP Healthcare GDSN Extension work group, including:

- Latex markings: Australia is not yet requiring any latex content markings, while the U.S. is recommending a field that conveys if an item "Contains Latex".
- Package dimensions: Australia recommends filling an attribute with 999999 if data is not available, while the U.S. requires dimensions for middle and case, but recommends filling the EA level with the cube root if EA level dimensions are not available.
- Package markings: U.S. recommends "bar code type" if package is marked with a bar code.
- Weights: Australia requires gross weights only when the package level is "Shippable" or "Orderable", while the U.S. is recommending gross weights on all package levels.
- Overall Number of Attributes: Australia's attribute model is much more developed than the U.S. model; in the future and as the U.S. moves to adopt additional attributes, other country models should be reviewed before recommendations are made in an effort to utilise existing best practices and to streamline data requirements for global manufacturers.

Regardless of the gaps identified in the attribute analysis, demand side participants agreed that the product data provided would be useful in its current state.

Amerinet

Amerinet noted how they were able to received data as part of the global pilot without having to make any adjustments in the way they have received GDSN data as part of its participation in the U.S. Department of Defense pilot.

"Amerinet was pleased with the ease in which we were able to receive data from the GDSN in this global pilot", said Mary Beth Lang, Senior Vice President, Amerinet, Inc. *"The global adoption of the GDSN is very important for our organisation, and we will continue to do whatever we can to keep our demand side and supply side partners moving toward the implementation of this important data synchronisation standard."*

Ascension Health

"Ascension Health has been actively involved with the Department of Defense on a national GDSN pilot", said Sue Tyk, Senior Director, Ascension Health Supply Chain. *"This global pilot confirms that we can synchronise product information between seller and buyer to standardise Healthcare data to benefit all areas of Healthcare – from*

supplier to distributor to Healthcare provider – not just nationally, but globally."

Premier

"Premier has learned, from this pilot, that the technology works in various settings and that we are in a good position to connect to and receive data from the GDSN", said Lance Richey, Premier, Inc. *"We have also learned that the content of the data received varies depending on the supplier. We will work with our suppliers and the industry to improve and standardise the attributes flowing through the GDSN. A high level review of just two of the processes within Premier netted a saving of US$250,000 in labour in the first year after full and complete adoption".*

Sisters of Mercy Health System

"Results of the Global GDSN Pilot are clear and definitive. We are confident that effective means of data synchronisation is in place and useable today and that synchronising with global data pools is as straightforward as it is with domestic ones", said Vance B. Moore, President Resource Optimization and Innovation, a division of the Sisters of Mercy Health System. *"ROi, Sisters of Mercy is committed to the adoption of GDSN and GS1 Standards. We firmly believe the use of GTIN's, GLN's and Global Data Synchronisation will result in dramatic improvement in the healthcare supply chain and ultimately will have a decisive impact on patient care. These standards are the foundation of our ability to order supplies error-free and track the product complete from dock to patient. The clarity resulting from GS1 Standards adoption will greatly reduce operational and clinical frustration that exists from our current unsynchronised methods. Less frustration and distractions will reduce clinician error and improve patient safety. The success of this pilot has armed us with the knowledge to convert hope to confidence and this confidence will provided the momentum necessary to move towards a controlled production pilot in the upcoming months."*

5. Next steps

5.1 Standards development

The GSMP Healthcare GDSN Extension work group is working on further enhancements to GDSN attributes to support Healthcare specific data requirements. While the global community refines these enhancements to support additional product data needs, users already implementing GDSN (or planning to) can continue as planned. There is no need to delay these plans or to wait until the additional requirements are defined. The current GDSN standard provides support for 228 Healthcare specific business needs, and reaps the benefits which other sectors are realising through implementation of the GDSN.

The GS1 Healthcare Classification work team has been re-engaged to draft a recommendation for the development of a global solution to product classification in Healthcare.

5.2 Adoption and implementation

GDSN implementation guidelines are being developed based on the lessons learned via this pilot as well as the experiences of leading users.

GS1 Healthcare US is developing plans to migrate users into GDSN production. The U.S. GDSN Pilot Work Group, working with the GS1 Healthcare US GDSN Work Group, has incorporated the lessons learned from the Global Pilot into an updated Data Field Recommendation template. The recommendation includes approximately 40 GDSN fields that have been reviewed and approved by U.S. participants as the foundation for GDSN adoption in U.S. Healthcare.

Australia will continue the production roll out of the National Product Catalogue, which is now also being endorsed by the Private Healthcare sector.

GS1 is working with additional GS1 Member Organisations to determine future pilot expansion needs for other countries.

Appendix A:
Recommended steps to implement GDSN

We propose the following general approach to implementing use of the GDSN within your organisation:

Step 1: **Establish a core business team**
• Obtain executive/business sponsorship (commitment and business perspective)
• Secure technical resource (day-to-day functionality)

Step 2: **Gather Implementation information**
• Collect technical documents and implementation information
• Become involved in the GS1 Healthcare and local Member Organisation implementation work groups and possible local pilots
• Local Activity: Awareness, education and implementation
• Global Activity: Get involved in global industry consensus and standards development work
• Contact a GDSN certified data pools http://www.gs1.org/productssolutions/gdsn/

Step 3: **Create an implementation team**
• Identify the internal cross-functional representations
• Choose a GDSN-certified data pool
• Ask about successful implementations experiences
• Can they address your needs?
• Ask for references

Step 4: **Locate your data**
• Clean your data!
• Ensure you have a Global Location Number (GLN) and Global Trade Item Numbers (GTINs)
• Develop a process to measure and maintain data quality www.gs1.org/productssolutions/gdsn/dqf/index.html
• Do NOT underestimate this step!

Step 5: **Migrate to Production**
• Add clean product information into the data pool
• Establish a relationship with a your supply chain partner to synchronise product and location information
• Add any required additional data attributes and transmit to chosen supply chain partner
• Roll out product information to other supply chain partners

Specific Recommendations

Healthcare manufacturers
• Conduct an assessment and internal audit of GS1 Company prefixes
• Join / confirm GS1 membership (Company Prefix) and contact person registered with GS1 Member Organisation
• Develop process to assign GTINs
• Communicate GTIN assignment plan to customers
• Assign GTINs to products and associated information
• Mark packaging and (where applicable) products with GTINs (bar codes)
• Gather, cleanse and develop a process to maintain associated data
• Develop internal system capabilities to capture GTINs and product attributes
• Engage a GDSN data pool, and solution providers as appropriate
• Publish GTIN and necessary product information to GDSN
• Transact using GTINs and GLNs

Healthcare providers:
• Define method to access data in the GDSN, (e.g. directly or through a GPO or solution provider)
• Assign GLNs to the hospital and entities as needed
• Conduct internal assessment of your systems' capabilities
• Develop a work plan and discuss with your solution provider
• Communicate with suppliers and assess their readiness to begin using the GDSN
• Access GDSN via a GDSN-certified data pool or via a solution provider
• Integrate GTINs and master data into existing processes
• Transact using a GDSN data pool

Appendix B: GDSN Mandatory Attributes

- There are 24 Mandatory Attributes required to operate in the GDSN
- The first 7 attributes are required to register products in the GS1 Global Registry
- Target market sub-division is optional
- The other 17 attributes are required to exchange data

across the network (within one date pool or across two or more data pools)
- Of these 17 attributes, 10 require Yes/No responses related to the product
- The other 7 attributes require actual product related data

Attributes required for the Global Registry

	MANDATORY ATTRIBUTES	DESCRIPTION
1	GLN of Source Data Pool	The data pool that serves as the entry point into the GDSN and connection to other GDSN certified data pools. (**contentOwner**)
2	GLN of Data Source	Entity that provides the global data synchronization network with Master Data. (**dataSource**)
3	GTIN	The Global Trade Item Number of the product (drugs, medical device, non medical supply (e.g. light bulbs). (**gTIN**)
4	Target Market Country Code	The country where the product is intended to be sold. (**targetMarketCountryCode**)
5	Target Market Subdivision Code (optional)	The code for country sub-division definition used to indicate the geo-political subdivision of the target market. (**targetMarketSubdivisionCode**)
6	GPC	The Global Product Classification is the GS1 classification system used in the Global Registry. The GPC identifies a category for the product (GTIN) registered. (**classificationCategoryCode**)
7	State	The four states are: Registered , Cancelled, In Progress, and Discontinued. (**state**)
8	Date	Attribute names: registrationDate, cancelDate, deletionDate, discontinuedDate, lastChangeDate. The last changed date is generated by the Global Registry.

Other Mandatory GDSN Attributes

	MANDATORY ATTRIBUTES	DESCRIPTION
9	Information Provider of Trade Item	GLN and additional identification of the party providing the information of the trade item. This is the data source. (**informationProviderOfTradeItem**)
10	Hierarchy Level per GS1 Code List	Describes the hierarchical level of the trade item. TradeItemUnitIndicator is mandatory. Examples: "CASE" , "PALLET". (**tradeItemUnitDescriptor**)
11	Brand Name	The recognizable name used by a brand owner to uniquely identify a line of trade item or services. (**brandName**)
12	Functional Name	Describes use of the product or service by the consumer. Should help clarify the product classification associated with the GTIN. (**functionaName**)
13	Base Unit? (Y/N)	An indicator identifying the trade item as the base unit level of the trade item hierarchy. This is a y/n (Boolean) where y indicates the trade item is a base unit. (**isTradeItemABaseUnit**)

	MANDATORY ATTRIBUTES	DESCRIPTION
14	Consumer Unit? (Y/N)	Identifies whether the current hierarchy level of a trade item is intended for ultimate consumption. For retail, this trade item will be scanned at point of sale. At retail, this data is commonly used to select which GTINs should be used for shelf planning and for front end POS databases. This value reflects the intention of the Information Provider which may not necessarily be reflected by the retailer. (**isTradeItemACosumerUnit**)
15	Despatch Unit? (Y/N)	An indicator identifying that the information provider considers the trade item as a dispatch (shipping) unit. This may be relationship dependent based on channel of trade or other point to point agreement. (**isTradeDespatchUnit**)
16	Invoice Unit? (Y/N)	An indicator identifying that the information provider will include this trade item on their billing or invoice. This may be relationship dependent based on channel of trade or other point to point agreement. (**isTradeItemAnInvoiceUnit**)
17	Orderable Unit? (Y/N)	An indicator identifying that the information provider considers this trade item to be at a hierarchy level where they will accept orders from customers. This may be different from what the information provider identifies as a despatch unit. This may be a relationship dependent based on channel of trade or other point to point agreement. (**isTradeItemAnOrderableUnit**)
18	Variable Measure? (Y/N)	Indicates that an article is not a fixed quantity, but that the quantity is variable. Can be weight, length, volume. Trade item is used or traded in continuous rather than discrete quantities. (**isTradeItemAVariableUnit**)
19	Returnable Packaging? (Y/N)	Trade item has returnable packaging. Attribute applies to returnable packaging with or without deposit. (**isPacakagingMarkedReturnable**)
20	Batch/Lot Number? (Y/N)	An indicator that a batch or lot number is assigned by the manufacturer. Differs from Serial Number which is a manufacturer assigned code. (**hasBatchNumber**)
21	Non-sold Item Returnable? (Y/N)	An indicator that the buyer can return products not sold. For example, used with magazines and bread. This is a y/n (Boolean) where y equals right of return. This is at least relevant to General Merchandise, Publishing industries and for some Fast Moving Consumer Goods (FMCG) trade items. (**isNonSoldTradeItemReturnable**)
22	Marked Recyclable? (Y/N)	Trade item has a recyclable indication marked on it. This may be a symbol from one of many regional agencies. (**isTradeItemMarkedAsRecyclable**)
23	Height & UoM	The measurement of the height of the trade item. The vertical dimension from the lowest extremity to the highest extremity, including packaging. At a pallet level the trade item Height will include the height of the pallet itself. Business Rules: Measurements are relative to how the customer normally views the trade item. Needs to be associated with a valid Unit of Measure (UoM). (**height**)
24	Width & UoM	The measurement from left to right of the trade item. Measurements are relative to how the customer normally views the trade item. Needs to be associated with a valid UoM. (**width**)
25	Depth & UoM	The measurement from front to back of the trade item. Measurements are relative to how the customer normally views the trade item. Needs to be associated with a valid UoM. (**depth**)

*   These three attributes are part of the Trade item Marking class (tradeItemMarking), which is a mandatory class. At least one of these attributes must be populated .

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